RECLAMATION
Managing Water in the West

Frequently Asked Questions Stampede Dam Safety of Dams Modification

1 – What is being planned for Stampede Dam?
The Bureau of Reclamation plans to raise the existing dam and dike 11.5 feet using mechanically stabilized earth construction techniques. The spillway crest structure will be modified to accommodate the raised embankment crest road and limit peak flows through the spillway to maintain current flood operations in the Little Truckee River. Two small earthen dikes will be constructed in low lying areas on the south rim of the reservoir.

2 – Why is this being done?
Recent investigations indicated that Stampede Dam cannot safely pass floodwaters in accordance with Reclamation's Dam Safety Public Protection Guidelines. Modifications are needed to prevent potential overtopping of the dam during an extreme flood event. The Public Protection Guidelines are available on Reclamation's website at http://www.usbr.gov/ssle/damsafety/references.html.

3 – What is the threat?
The threat is potential for overtopping of the embankment leading to failure of both Stampede Dam and Boca Dam (6 miles downstream of Stampede Dam). Failure of both dams would result in significant downstream loss of life, property damage and environmental impacts through the city of Reno and surrounding populated areas.

4 – What flooding events have occurred in this area?
The most recent significant events occurred in 1997 and 2005. On January 1-3, 1997, flooding was extensive in downtown Reno, at the Reno/Tahoe International Airport, and in the industrial area of Sparks. In 1997, as the event began, Stampede Reservoir was at a restricted winter flood control limit in accordance with standing operating procedures. The 1997 flood event used the full flood control space in Stampede Reservoir which then led to uncontrolled releases through the ungated spillway of approximately 2,600 cubic feet per second for over a week. Stampede Dam released very little during the flood event of 2005 since its starting volume was significantly below the flood control limit and could therefore capture most of the storm runoff ahead of the peak flows. This available storage greatly helped to reduce the flooding through Reno in 2005.

5 – What alternatives are you looking at?
The preferred structural alternative is to raise the dam 11.5 feet to temporarily store flood waters. The spillway will be modified to restrict flows during extreme flood events by construction of a concrete headwall. No spillway modifications will be made to incorporate a gated crest structure. The non-structural alternatives investigated as part of every dam safety modification include a reservoir restriction, dam removal and no-action.

6 – How soon will you know which alternative is best? How will you determine that?
The preferred structural alternative was identified in 2010 at the completion of Corrective Action Studies. This determination was made as a result of risk analyses which indicate that the proposed 11.5-foot dam raise provides the necessary risk reduction as required by Reclamation's Dam Safety Public Protection Guidelines.

7 – Are there plans to store additional water in Stampede Reservoir?
No. None of the structural alternatives considered for the dam safety modification allow for the ability to store additional water in Stampede Reservoir. The preferred alternative to raise the dam does not include incorporating spillway gates to retain water. Floodwaters flowing into the reservoir will be released as quickly as the water can pass through the spillway and outlet works in accordance with standing operating procedures.

8 – What would happen if you just left the dam alone?
Reclamation would continue operating the dam in accordance with applicable procedures with no improvements to handle extreme flood events. Given a 75,000-year flood event or greater, Stampede Dam would be overtopped by floodwater resulting in dam failure. Overtopping outflows or breach outflows from Stampede Dam would cause overtopping and failure of downstream Boca Dam. The downstream population would continue to live with elevated risk of dam failure during a significant hydrologic event.

9 – When would construction start?
The earliest that construction would take place is 2013-2014.

10 – How long will this take?
It is estimated that two full construction seasons will be required to complete work due to significant snowfall and cold temperatures during the winter months.

11 – Will local water users have to repay any of the cost? If so, why?
No. The authorized purposes of Stampede Dam are to satisfy a trust responsibility to the Pyramid Lake Paiute Tribe and to benefit species under the Endangered Species Act. The Secretary of the Interior declared that water from Stampede Dam and Reservoir was to be used only for the conservation of the threatened Lahontan cutthroat trout and endangered cui-ui of Pyramid Lake. As such, there are no reimbursable purposes to which the Safety of Dams (SOD) modification work on Stampede Dam can be allocated. In addition, Public Law 101-618 declared the Washoe Project nonreimbursable.

12 – What effect will this project have on nearby residents and businesses?
Traffic and noise will temporarily increase during the construction period. Traffic control and noise abatement issues will be addressed in the construction solicitation.

13 – Will any private lands or structures be affected by the 11.5-foot raise?
A very limited amount of private land on the reservoir rim may be inundated for a short duration during an extreme flood event as the result of the raise but there currently are no private structures within the proposed new flood impact zone.

14 – What effect will this project have on downstream water users?
There are no short-term or long-term changes proposed in normal operations of Stampede Reservoir as a result of the SOD modification project.

15 – What effect will this project have on recreation downstream and in the reservoir?
The road across Stampede Dam and the Stampede Reservoir Vista Point will be closed for the anticipated 2-year duration of construction. However, the reservoir and other recreation facilities will remain open and be accessible from the west via State Highway 89 and the Dog Valley Road. Reclamation proposes to pave the currently unpaved segment of the Dog Valley Road during the construction period to facilitate public access to Stampede Reservoir and its recreation opportunities.

16 – What effect will this have on the environment?
Reclamation prepared a Final Environmental Assessment (EA) for the project and determined the

implementation of the preferred alternative will not significantly affect the quality of the human environment. Therefore, a Finding of No Significant Impact (FONSI) was signed on May 11, 2012. The Final EA/FONSI is available on Reclamation's website at http://www.usbr.gov/mp/nepa/nepa_projdetails.cfm?Project_ID=8182.

17 – Is there any threat of flooding if the dam breaks while you are working on it?
The threat of potential flooding with an extreme flood event is addressed in the response to question number 7. Several failure scenarios have been investigated including those involving large deformations or internal erosion of the embankment leading to an uncontrolled release of water that causes significant flooding downstream. The likelihood of events other than a hydrologic or flooding event occurring during construction has been estimated to be very small.

18 – Is the Probable Maximum Flood (PMF) standard used for Stampede Dam applied to other dams in California operated by Reclamation? If not, why has this standard been selected for Stampede Dam?
Yes, Reclamation does use the PMF standard for other dams, for example safety modifications are being made to Folsom Dam located outside the city of Sacramento to safely pass the PMF through a new emergency spillway. It is not unusual for a high hazard dam, such as Stampede Dam, to be designed for the PMF; however, this may not be true for all Reclamation dams in California. Reclamation performs risk analyses to determine the threshold flood event at which dam safety risks fall below limits established in Reclamation's Public Protection Guidelines. The risk analyses indicate that Reclamation should design safety modifications based on the PMF for Stampede Dam.

19 – Is the PMF required and, if so, how is the No Action Alternative an option?
As explained in the response to Question 18, the PMF is the required design flood event for Stampede Dam based on risk analysis evaluations. The No Action Alternative is an option that must be considered as part of the due diligence process for dam safety modifications to existing dams. Evaluation of a No Action Alternative is also an important part of the environmental assessment process. As a result, Reclamation has considered the continued operation of the dam without structural modifications and determined the risks to the downstream population would not meet Reclamation's current Public Protection Guidelines.

20 – Why has Reclamation selected a 250,000 year event to define the PMF for Stampede?
Stampede Dam was originally designed and constructed in the late 1960's and early 1970's to safely pass the PMF. The PMF is the maximum flooding that could occur in a given drainage basin resulting from the Probable Maximum Precipitation (PMP). The PMP is the maximum precipitation that could occur given the right atmospheric conditions in a given time period. Since the 1970's, Reclamation has learned more about estimating both the amount of precipitation associated with extreme flooding (such as the PMF) as well estimating the frequencies (return periods) for extreme flooding. Reclamation now estimates the PMF would overtop and fail Stampede Dam. The flood failure of Stampede Dam will overtop downstream Boca Dam. The failure of both Stampede and Boca are estimated to release over 1,000,000 cubic feet per second of water in the downstream Reno/Sparks metro area. This level of flooding is estimated in some areas to a depth of 40 to 60 feet, and place hundreds of thousands of people at risk. Property damages are estimated in the tens of billions of dollars.

Floods approaching the PMF have occurred around the country. The recurrence frequency for PMF's can range from less than 10,000 years to nearly 1,000,000 years. Reclamation estimates the PMF for Stampede Dam has a recurrence frequency of 250,000 years. The PMF is a common industry design standard used by most federal and state dam owners and regulating agencies for high and significant hazard dams. When the risk for loss of life and property damage is as significant as it is downstream of Stampede Dam and Boca Dam, Reclamation is compelled to prevent these losses by designing to safely pass extreme flooding events.

21 – How were flood return periods determined for the project?
Detailed flood frequency analyses were completed by Reclamation's Flood Hydrology Group to estimate flood return periods at Stampede Dam. Specifically, Reclamation uses industry accepted procedures for completing hydrologic hazard analyses incorporating historical precipitation records compiled by the National Oceanic and Atmospheric Administration, depth-duration design guidelines published by the National Weather Service and incorporating results from regional paleoflood studies. The results of these studies are used to estimate return periods for storm and corresponding runoff events for extreme hydrologic events up to and including the PMF.

22 – While there are adopted methods to determine PMF, there are inaccuracies related to calculating PMF for purposes of dam design. How does Reclamation address these inaccuracies?
Development of a PMF for any dam does involve uncertainty. PMF events are recognized as practical upper limits to flood events at a given site assuming extreme precipitation conditions occur in conjunction with optimal runoff conditions. While development of the PMF does involve assumptions and uncertainties, the PMF is recognized as the industry-accepted standard used by most federal and state dam owners and regulating agencies to evaluate inflow design flood events for high and significant hazard dams such as Stampede Dam. To address uncertainty associated with the PMF, Reclamation provides freeboard (extra water storage area) above the maximum reservoir water surface elevation resulting from a PMF flood event. The freeboard represents a factor of safety against overtopping the dam during the PMF. For Stampede Dam a safety factor of 110 percent of the PMF was used to ensure that enough freeboard is included in the proposed modifications and to address the uncertainty associated with development of the PMF.

23 – How much will the project cost to construct?
Generally accepted industry resources, costs from previously constructed projects, and engineering judgment have been used to develop planning cost estimates to construct the project. The planning cost estimates are used as a tool to realize project management objectives and assess budgetary requirements. Actual bid prices are affected by a number of factors such as supply and demand for the types of construction required at the time of bidding and in the project vicinity; changes in material supplier costs; changes in labor rates; and the competitiveness of contractors and suppliers. To maintain the competitive integrity of the bidding process, detailed information regarding the planning cost estimates cannot be made available to the public.

24 – Have earthquake hazards been considered in the project design?
Yes. The design of project features took into consideration the potential for a significant earthquake event at Stampede Dam. Similar to hydrologic studies, Reclamation's Seismotectonics Group uses current engineering practices for establishing earthquake potential at the site including evaluations of all known faults based on the most recent fault mapping of the region. Recent investigations include updating and revising earthquake ground motions and loadings, field explorations to better define foundation material properties, and reevaluating the potential for liquefaction and the magnitude of potential deformations. The reevaluation of seismic risks at Stampede Dam resulted in diminishing justification to take action to reduce the risk of dam failure associated with an extreme seismic event.

25 – Who can I call for more information on this project?
For additional information, please contact Joan Goodwin, Dam Safety Program Manager, Bureau of Reclamation, at 916-978-5537, email jmgoodwin@usbr.gov or visit http://www.usbr.gov/mp/sod/projects/stampede/index.html.